REMARKS

Applicants thank the Examiner for the very thorough consideration given the present application.

Claims 39-46, 56-57 and 59-63 are now pending. Claims 39, 56 and 59 are independent. Claims 47-50, 58 and 64-97 have been canceled. No claims have been amended.

Reconsideration of this application, as amended, is respectfully requested.

Restriction Requirement

In the Office Action mailed October 23, 2006, the Examiner maintained the restriction requirement and made the requirement final. In paragraph 2.3, the Examiner stated that claims 39-46, 56-57 and 59-63 were being considered in the Office Action. Applicant has canceled the restricted and withdrawn claims, and is only pursuing the fifteen claims, including three independent claims, as considered by the Examiner. Applicant reserves the right to file a Divisional Application to the restricted claims at a later date.

Accordingly, reconsideration and withdrawal of the restriction requirement are respectfully requested.

Drawing Objection

The Examiner has required formal drawings. Formal drawings are submitted herewith.

Accordingly, reconsideration and withdrawal of the objection to the drawings are respectfully requested.

Specification and Claim Objections

The Examiner objected to the Specification and Claims 41 and 60 for failing to provide antecedent basis in the specification for the claimed recitation "the first rate of decline is about 0.2 per decade of frequency across the frequency range of 1 MHz to 1 GHz." Applicants thank the Examiner for the noted oversight. Paragraph [045] of the specification has been amended to provide antecedent basis for the claim language. Support for the amendment can be seen in the phrase immediately proceeding the insertion, where the rate of decline is indicated to be 0.6 over three decades of frequency across the frequency range of 1 MHz to 1GHz.

Accordingly, reconsideration and withdrawal of the objection to the Specification and Claims 41 and 60 are respectfully requested.

Double Patenting

Claim 39 stands provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1 of co-pending Application No. 10/845,104. Applicant voluntarily submits herewith a terminal disclaimer. Therefore, this rejection has been rendered moot.

Rejection Under 35 USC 103

Claims 39-46, 56, 57 and 59-63 stand rejected under 35 USC 103(a) as being unpatentable over Aekins (US 6,057,743) in view of Ninomiya (US 2001/0048592). This rejection is respectfully traversed.

Aekins

Aekins is certainly related art and shows a printed circuit board for providing crosstalk

compensation in an electrical connector. Aekins' printed circuit board has a three stage compensation scheme. For example, see the graphical first, second and third stage compensations occurring at reference numerals 30a, 30b and 30c, in Figure 1. Also, reference may be had to Figures 2-5 to see the first, second and third stages 141, 142 and 143 in a physical layout of capacitors and inductive traces.

Aekins is similar to U.S. Patent 5,997,358 discussed in Applicants' background of the invention section. Basically, instead of having a "lump-sum" single stage compensation to compensate for crosstalk occurring in the plug and jack (see col. 2, lines 47-50 of Aekins), Aekins provides for three stages. An embodiment of U.S. Patent 5,997,358 provided for two stages. According to Aekins and 5,997,358, if the compensation signal were applied in stages, the compensation signal could more completely offset the offending crosstalk in the plug/jack, due to phase considerations of the compensation signal.

It appears that Applicants and the Examiner agree that Aekins fails to show or suggest any structure having different dielectric constants. Aekins does not show a first dielectric material having a first dielectric constant (e.g. 3.9) at a particular given frequency (e.g. 1 GHz) and a second dielectric material having a second, different dielectric constant (e.g. 3.5) at the same given frequency (e.g. 1 GHz). Alternatively, Aekins does not show a first dielectric material having a first dielectric constant which changes at a particular rate per decade of frequency (e.g. 0.4 per decade of frequency from 1KHz to 1GHz) and a second dielectric material having a second dielectric constant which changes at a different particular rate per decade of frequency (e.g. about 0.0 per decade of frequency from 1 KHz to 1GHz).

It is clear in Aekins that although one may select a circuit board having a desired dielectric constant (col. 4, lines 45-48), there is simply no showing or suggestion (1) to have a

circuit board possessing portions and/or layers of different dielectric constants and/or dielectric rates, or (2) to have two circuit boards with different dielectric constants and/or dielectric rates.

Ninomiya

Ninomiya shows a printed circuit board for a computer system. The printed circuit board has a first signal path 21 for high-speed data signals and a second signal path 23 which is a power plane for supplying power to the printed circuit board. The first signal path passes along a material having a first dielectric constant and the second signal path passes along a material having a second and higher dielectric constant (paragraph 0048, lines 7-18).

The focus of Ninomiya is to match the impedance for the high-speed signal path (paragraph 0052, lines 16-22). The high-speed signal path is presented with a matching impedance (typically 50 ohms) when the power plane signal path is presented with a much lower impedance due to being exposed to a material of a relatively high dielectric constant (paragraph 0048, lines 12-14).

Applicants appreciate the Examiner's observation of the scientific principal that different materials having different dielectric properties can inherently have different rates of change of dielectric constants whether with frequency or with temperature. However, even in accepting this scientific principal, it is respectfully submitted that the combination of Aekins and Ninimiya fail to show or suggest Applicants' invention as claimed, as set forth below.

<u>The combination of Aekins and Ninomiya</u>

<u>as applied to independent claims 39, 56 and 59</u>

The combination of Aekins and Ninomiya fails to show or render obvious the subject matter of Applicants' independent claims 39, 56 and 59 for at least three independent reasons.

I.

First, each of Applicants' independent claims 39, 56 and 59 share a related distinguishing feature. Claim 39 requires that the first and second compensation structures compensate a **<u>same</u>** first trace of a plurality of conductive traces. Claim 56 requires that the first and second capacitors are connected to a **<u>same</u>** first conductor of a plurality of conductors. Claim 59 requires that the first and second compensation stages are coupled to a **<u>same</u>** first path of a plurality of conductive paths. Independent claims 39, 56 and 59 are reproduced below with bolding and underlining to emphasis the claimed characteristics summarized above.

> 39. A printed circuit board for providing crosstalk compensation in an electrical connector, comprising:
> a plurality of conductive traces;
> a first compensation structure providing a first crosstalk compensation signal having a first magnitude **to <u>a first</u> of the plurality of conductive traces**; and
> a second compensation structure providing a second crosstalk compensation signal having a second magnitude **to <u>the first</u> of the plurality of conductive traces**;
> wherein a ratio of the first magnitude to the second magnitude varies with frequency.
>
> 56. A printed circuit board for an electrical connector, the printed circuit board comprising:
> a plurality of conductors;
> a first capacitor electrically connected **to <u>a first</u> of the conductors**, the first capacitor having a first dielectric with a first dielectric constant slope; and
> a second capacitor electrically connected **to <u>the first</u> of the conductors**, the second capacitor having a second dielectric with a second dielectric constant slope,

wherein a difference between the first dielectric constant slope and the second dielectric constant slope is at least 0.15 per decade of frequency.

59. A printed circuit board comprising:

a plurality of conductive paths that extend from a plurality of respective inputs of said printed circuit board to a plurality of respective outputs of said printed circuit board;

a first compensation stage for capacitively coupling crosstalk compensation having a first polarity **onto a first path** of said plurality of conductive paths, said first compensation stage including at least one first capacitive element that includes a first dielectric constant material that has a first rate of change with frequency; and

a second compensation stage for capacitively coupling crosstalk compensation having a polarity opposite the first polarity **onto said first path of said plurality of conductive paths**, said second compensation stage including at least one second capacitive element that includes a second dielectric constant material that has a second rate of change with frequency, wherein the first rate of change and the second rate of change differ by between about 0.15 to about 0.45 per decade of frequency.

The Examiner has stated that the combination of Aekins and Ninomiya show such an arrangement, however Applicants cannot agree. Ninomiya shows only that a first signal path travels along a first dielectric, which may have its own unique constant and inherent unique rate of change based upon a frequency of the signal, and that a second signal path runs along a second dielectric which may have its own different dielectric constant and inherent different dielectric rate of change based upon a frequency of the signal. Ninomiya fails to show a single signal path influenced by two different dielectrics, as claimed.

A review of the various embodiments of Ninomiya show a system wherein a first signal path 21 is influenced by a first dielectric layer 26 and a second signal path 23 is influenced by a second dielectric layer having a different dielectric constant (and perhaps a different dielectric rate of decline as pointed out by the Examiner). The Second dielectric layer can be formed by adding a high dielectric constant layer 31 over the second signal path 23 (Figure 7), by providing a separate dielectric layer 61 under the second signal path 23 (Figure 12), by changing the

thickness of the dielectric layer under the second signal path 23 (Figure 14), etc.

Applicants have completely reviewed the Ninomiya reference and cannot find an embodiment wherein the first signal path 21 is exposed to two different dielectric constant values. The first signal path 14 is simply exposed to a constant first dielectric value which results in an ideal impedance Zo.. Likewise, none of the embodiments show a situation where the second signal path 23 is exposed to two different dielectric constant values. The second signal path is simply exposed to a constant second dielectric value which results in "The coincidence of impedance Zo of the signal line 14 with the resistance of the termination resistor 12" (paragraph 0037, lines 13-15)

Based upon the teachings of Ninomiya it, would not be obvious to have the first signal path 21 exposed to the second dielectric constant associated with the second signal path 23. Also, it would not be obvious to have the second signal path 23 exposed to the second dielectric constant associated with the first signal path 21. Such an arrangement would be destructive to the impedance matching objectives of the Ninomiya reference, as the impedance value would not be optimized for the particular signal path.

If Ninomiya is hypothetically combined with Aekins for some reason, one of the signal paths of Aekins (e.g. signal path 22) would have a first dielectric constant associated therewith, and a second signal path (e.g. signal path 28) would have a second, different dielectric constant associated therewith. This combination of references still fails to show the invention as claimed, as a single and same signal path is not exposed to capacitors or compensation structures or stages associated with different dielectric constant rates. Therefore, the combination still fails to show or suggest the claimed invention.

Although the above discussion has focused on one common distinction of the

independent claims over the combination of Aekins and Ninomiya, this should not be construed as an admission that this is the only reason to reconsider the rejection of record. The claims recite separate respective combinations of elements, each of which should be considered separately patentable. For example, it should be noted that the combination of Aekins and Ninomiya fails to show or suggest that the second compensation stage has an opposite polarity as compared to the first compensation stage, as recited in independent claim 59.

II.

Second, Ninomiya teaches how to reduce the impedance of one of the signal paths, almost to 0 ohms, by exposing it to a material having a relatively high dielectric constant, in order to ensure high-speed data signal transmission that is free of reflections (paragraph 0039). Each of the four signal pairs of Aekin's connector, according to Aekins, should be capable of carrying a high frequency data signal (col. 2, lines 40-41).

Accordingly, if one were to apply the teachings of Ninomiya to Aekins, one would ensure that the impedance of at least one of the four signal pairs in Aekins' connector is reduced, almost to 0 ohms, by exposing it to a material having a relatively high dielectric constant,. However, in doing so one would severely mismatch the impedance of that pair and thus degrade its ability to support reflection free transmission of high frequency signals contrary to the explicit teachings of Ninomiya.

III.

Third, the technology of Aekins and Ninomiya are completely divergent. It would not have been obvious to one of ordinary skill in the art of crosstalk compensating connectors to look

to the field of signal impedance matching in power fed computer printed wiring boards for memories. Ninomiya makes no mention of crosstalk issues, and it would be far beyond the scope of obviousness for one of ordinary skill in the art to take the two signal paths having different dielectric constants from Ninomiya's computer board and use the principal as a motivation to have the appropriate mix of dielectric properties favorably disposed at different crosstalk compensation stages in a connector. It is simply asking too much of the person of ordinary skill in the art to look at the two divergent references and "obviously" see the Applicants' invention, as claimed. The crosstalk compensation structure disclosed in the present application has remarkable advantages and structural distinctions not appreciated or suggested in the prior art of record.

For the reasons stated above, reconsideration and withdrawal of this rejection are respectfully requested.

Conclusion

In the event that any outstanding matters remain in this application, the Examiner is invited to contact the undersigned at (703) 621-7140 in the Washington, D.C. area.

All of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider all presently outstanding rejections and that they be withdrawn.

It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 50-3828 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Dated: November 30, 2006 Respectfully submitted,

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Attachment: Formal Drawings (8 Sheets – Figs. 1-5)